Arkansas Department of Career Education
Model Framework

Course Title: Mechanical, Plumbing and Electrical

Secondary – Skilled and Technical Sciences		
Course Number	493840	
Cluster	Architecture & Construction	
CIP Number	46.0415	
Grade Level	9-12	
Course Credit	1	
Prerequisite	Student must have completed Introductory Craft Skills or Intro to Architecture and Construction. It may be taken in conjunction with Carpentry.	
Course Type	Elective	
Teacher Certification	570/578	
CTSO	SkillsUSA	
Facility Requirements	http://arkansasfacilities.arkansas.gov/facilities/academic-facilities-manual	
Industry Certifications	http://www.nccer.org	

Course Description
This instructional program prepares individuals to apply technical knowledge and skills in heating, ventilation, and air conditioning; electrical and mechanical systems; and plumbing. It is a foundation course to combine electrical, plumbing and HVAC courses into a one credit introductory course.

Program Purpose/Structure
This course is based on components of NCCER electrical level 1, plumbing level 1 and HVAC level 1 curriculum.

Standard 1.0 Demonstrate an understanding of general and craft specific safety.			
Performance Indicator 1.1 **Demonstrate an understanding of general safety procedures.**	**Recommended Application/Activity** **02102-12/26102-14**	**CCSS Standards**	**CCTC Standards**
1.1.1 Recognize safe working practices in the construction environment.	• Perform a visual inspection on various types of ladders. • Set up a ladder properly to perform a task.		
1.1.2 Explain safety issues concerning lockout/ tagout procedures for energy sources, confined space entry, respiratory protection.	• Plan an escape route from the location in the event of an accident • Locate the phone closest to the work site and ensure that the local emergency telephone numbers are either posted at the phone or known by you and your partner(s).		
1.1.3 Describe how to handle unsafe acts and unsafe conditions.	• Inspect power tools (corded and cordless) to ensure they are safe to use. • Inspect hand tools to ensure they are safe to use.		
1.1.4 Demonstrate the use and care of appropriate personal protective equipment.	• Inspect and don the following personal protective equipment: • Gloves, body harness, hard hat, safety glasses, safety shoes, hearing protection		
Performance Indicator 1.2 **Demonstrate an understanding of electrical and HVAC safety.**	**Recommended Application/Activity** **26102-14**	**CCSS Standards**	**CCTC Standards**
1.2.1 Explain the purpose of OSHA and how it promotes safety on the job.	•		
1.2.2 Identify electrical hazards and how to avoid or minimize them in the workplace.	• Discuss the work to be performed and the hazards involved		
1.2.3 Develop a task plan and a hazard assessment for a given task and identify the benefits of a job safety analysis.	• Perform a hazard assessment of a job such as replacing the lights in your classroom • Properly don a harness.		
1.2.4 Describe the importance of LEED construction and energy management.	•		
1.2.5 Present information regarding refrigerants and the environment.	• Review building codes and permits.		
Performance Indicator 1.3 **Demonstrate an understanding of plumbing safety.**	**Recommended Application/Activity** **02102-12**	**CCSS Standards**	**CCTC Standards**
1.3.1 Describe the common unsafe acts and	•		

unsafe conditions that cause accidents and identify job-site hazardous work specific to plumbers.			
1.3.2 Explain how to work safely in and around a trench and around confined spaces.	•		
1.3.3 Explain how the cost of accidents and illnesses affects everyone on site.	•		
1.3.4 Identify how green technology is incorporated into plumbing.	•		
1.3.5 Identify the hazards and safety precautions associated with plastic pipe and copper tubing.	•		
Standard 2.0 Identify various requirements and career opportunities.			
Performance Indicator 2.1 **Locate and research career opportunities as an electrician.**	**Recommended Application/Activity** **26101-14**	**CCSS Standards**	**CCTC Standards**
2.1.1 Describe the general aptitudes, values and behaviors necessary/expected in the electrical trades industry.			
2.1.2 Describe the apprenticeship/training process for electricians.	•		
2.1.3 Describe various career paths/opportunities one might follow in the electrical trade.	• Research entrepreneurial opportunities and challenges that		
2.1.4 Define the various sectors of the electrical industry.	•		
2.1.5 State the tasks typically performed by an electrician.	• Explain the responsibilities and aptitudes of an electrician.		
2.1.6 Design a career ladder for an electrician from coursework and apprenticeship to project manager.	•		
Performance Indicator 2.2 **Locate and research career opportunities as a journeyman and master plumber.**	**Recommended Application/Activity** **02101-12**	**CCSS Standards**	**CCTC Standards**
2.2.1 Identify the responsibilities of a person working in the plumbing industry.	•		
2.2.2 State the personal characteristics of a professional plumber.	•		
2.2.3 Identify the stages of progress within the plumbing profession and its positive impact on	•		

society.			
Performance Indicator 2.3 **Demonstrate an understanding of a career as heating ventilation and air-conditioning technician.**	**Recommended Application/Activity** **03101-13**	**CCSS Standards**	**CCTC Standards**
2.3.1 Emphasize the important role of the HVAC technician in maintaining indoor air quality and energy efficiency.	•		
2.3.2 Identify the responsibilities and characteristics needed to be a successful HVAC technician.	• Explain craft licensing and certification requirements.		
2.3.3 Identify career paths available in the HVAC trade career opportunities.	• Present students with a variety of HVAC career options and review USDOL statistics on the trade.		

Standard 3.0 Demonstrate knowledge of specific craft tools and fundamentals.			
Performance Indicator 3.1 **Demonstrate the operations of and describe the pieces of electrical test equipment.**	**Recommended Application/Activity** **26112-14**	**CCSS Standards**	**CCTC Standards**
3.1.1 Identify and explain the test equipment tools.	• Under instructor supervision, measure the voltage in your classroom from line to neutral and neutral to ground. • Under instructor supervision, use an ohmmeter to measure the value of various resistors. • Demonstrate uses for: • Voltmeter • Ohmmeter • Clamp-on ammeter • Multimeter • Megohmmeter • Motor and phase rotation testers		
3.1.2 Select the appropriate meter for a given work environment based on category ratings.	•		
3.1.3 Identify the safety hazards associated with the various types of test equipment.	•		
Performance Indicator 3.2 **Demonstrate knowledge of specific craft tools and fundamentals in the plumbing craft.**	**Recommended Application/Activity** **02103-12**	**CCSS Standards**	**CCTC Standards**
3.2.1 Identify the basic hand and power tools used in the plumbing trade.	• Demonstrate the proper use of plumbing tools. • Demonstrate the ability to select the proper tool(s) for tasks.		

3.2.2 Demonstrate proper maintenance and storage for hand and power tools.	•		
3.2.3 Describe the safety requirements for using power and hand tools common to the plumbing trade.	•		
Performance Indicator 3.3 **Demonstrate an understanding of the basic principles of heating, ventilation, and air conditioning.**	**Recommended Application/Activity** **03101-13**	**CCSS Standards**	**CCTC Standards**
3.3.1 Explain the principles of heating.			
3.3.2 Explain the principles of ventilation.			
3.3.3 Explain the principles of air conditioning.			

Standard 4.0 Demonstrate knowledge of basic math principles.			
Performance Indicator 4.1 **Demonstrate an understanding of basic math principles.**	**Recommended Application/Activity** **03102-13/02104-12/26103-14**	**CCSS Standards**	**CCTC Standards**
4.1.1 Identify the functions of a construction trade calculator.	•		
4.1.2 Add, subtract, multiply, and divide whole numbers, fractions and decimals.	•		
4.1.3 Convert decimals to percentages and percentages to decimals. Convert fractions to decimals and decimals to fractions.	•		
4.1.4 Identify units of measurement between the USA the metric measuring systems.	• Explain importance in various trades.		
4.1.5 Convert, length, area, volume and weight values.	•		
4.1.6 Convert pressure and temperature values.	•		
4.1.7 Identify the parts of a fitting and use common pipe-measuring techniques. Calculate end-to-end measurements using fitting allowances and thread makeup.	• Use fitting dimension tables to determine fitting allowances and thread makeup. • Measure pipe using the following methods: • End-to-end, End-to-center, Center-to-center, End-to-face, Face-to-face, Face-to-throat • Determine end-to-end dimensions by figuring fitting allowances and thread makeup.	•	•
Performance Indicator 4.2 **Perform basic conduit and pipe bends.**	**Recommended Application/Activity**	**CCSS Standards**	**CCTC Standards**
4.2.1 Demonstrate the ability to precisely cut and	•		

bend electrical conduit for the appropriate length and angle.			
4.2.2 Demonstrate the ability to precisely cut and bend copper and plastics plumbing pipe.	•		
Performance Indicator 4.3 Calculate electrical measurements	**Recommended Application/Activity**	**CCSS Standards**	**CCTC Standards**
4.3.1 Define voltage and identify the ways in which it can be produced.	• Explain the basic characteristics of series and parallel circuits.		
4.3.2 Define the units of measurement that are used to measure the properties of electricity.	•		
4.3.3 Identify the meters used to measure voltage, current, and resistance.	• Explain the difference between conductors and insulators.		
Standard 5.0 Demonstrate a knowledge of the basic principles of electrical and HVAC systems.			
Performance Indicator 5.1 Describe the fundamentals of electricity.	**Recommended Application/Activity 03106-13/26104-14**	**CCSS Standards**	**CCTC Standards**
5.1.1 State how electrical power is created and distributed.			
5.1.2 Demonstrate safe electrical wiring stripping and connecting to breakers, switches and receptacles.			
5.1.3 Describe the difference between alternating current and direct current.	•		
Performance Indicator 5.2 Understand and explain basic electrical theory and circuitry.	**Recommended Application/Activity**	**CCSS Standards**	**CCTC Standards**
5.2.1 Define voltage, current, resistance, and power and describe how they are related.	• Use the proper instrument to measure voltage in an energized circuit		
5.2.2 Explain the basic characteristics of combination circuits.			
5.2.3 Calculate, using Kirchhoff's voltage law, the voltage drop in series, parallel, and series-parallel circuits. And calculate, using Kirchhoff's current law, the total current in parallel and series-parallel circuits.			
5.2.4 Use Ohm's law to calculate the current, voltage, and resistance in a circuit. And using Ohm's law, find the unknown parameters in series, parallel, and series-parallel circuits.	• Use the power formula to calculate how much power is consumed by a circuit.		

5.2.5 Describe the differences between series and parallel circuits and calculate circuit loads for each type.	• Use the proper instrument to measure current in an energized circuit.		
5.2.6 Demonstrate and explain the usage of various gauges of wire and typical uses.			
Performance Indicator 5.3 **Demonstrate the ability to read and follow basic electrical schematic diagrams.**	**Recommended Application/Activity**	**CCSS Standards**	**CCTC Standards**
5.3.1 Read and interpret schematic circuit diagrams.	•		
5.3.2 Design simple AC/DC diagrams to demonstrate current paths, switches resistance and breakers.	•		
Performance Indicator 5.4 **Identify the electrical instruments and describe their uses.**	**Recommended Application/Activity**	**CCSS Standards**	**CCTC Standards**
5.4.1 Identify HVAC measuring instruments	• Describe how voltage is measured. • Describe how current is measured. • Describe how resistance is measured.		
5.4.2 Identify electrical components used in HVAC systems and describe their functions.	• Use the proper instrument to measure resistance.		
5.4.3 Identify and describe various load devices and explain how they are represented on circuit diagrams.	•		
5.4.4 Identify and describe various control devices and explain how they are represented on circuit diagrams.	• Use a multimeter to check circuit continuity.		
5.4.5 Identify and describe the types of electrical diagrams used in HVAC work.	• Assemble and test series and parallel circuits using a transformer or battery, wires, and selected load devices.		

Standard 6.0 Demonstrate knowledge of the basic materials, equipment and supplies used in electrical, plumbing and HVAC systems.			
Performance Indicator 6.1 **Demonstrate knowledge of the basic materials used in electrical.**	**Recommended Application/Activity** **26111-13**	**CCSS Standards**	**CCTC Standards**
6.1.1 Explain the role of the National Electrical Code® in residential wiring and describe how to determine electric service requirements for dwellings.	• For a residential dwelling of a given size, and equipped with a given list of major appliances, demonstrate explain how to: • Compute lighting, small appliance, and laundry loads. • Compute the loads for large appliances. • Determine the number of branch circuits required.		

	• Size and select the service-entrance equipment (conductors, panel board, and protective devices).		
6.1.2 Explain the grounding requirements of a residential electric service.	• Using an unlabeled diagram of an electrical panel (Performance Profile Sheet 3), label the lettered components.		
6.1.3 Calculate and select service-entrance equipment.	• Select the proper type and size outlet box needed for a given set of wiring conditions.		
6.1.4 Select the proper wiring methods for various types of residences.	•		
6.1.5 Compute branch circuit loads and explain their installation requirements.	•		
6.1.6 Explain the types and purposes of equipment grounding conductors.	•		
6.1.7 Explain the purpose of ground fault circuit interrupters and tell where they must be installed.	•		
6.1.8 Size outlet boxes and select the proper type for different wiring methods.	•		
6.1.9 Describe the installation rules for electrical systems around swimming pools, spas, and hot tubs.	•		
6.1.10 Explain how wiring devices are selected and installed.	•		
6.1.11 Describe the installation and control of lighting fixtures.	•		
Performance Indicator 6.2 Demonstrate understanding of the basic materials used in fresh water plumbing.			
6.2.1 Identify the various types of plastic pipe.	• Select correct types of materials for plastic piping systems. •		
6.2.2 Identify the material properties, storage, and handling requirements of plastic pipe.	• Identify types of fittings and valves and their uses.		
6.2.3 Identify the types of fittings and valves used with plastic pipe	• Select the appropriate personal protective equipment for working with plastic piping.		
6.2.4 Identify the techniques used in hanging and supporting plastic pipe.	• Properly measure, cut, and join plastic pipe. Select the correct support and spacing for the application		
6.2.5 Identify the various types of copper tube.	• Select correct types of materials for copper tube systems. • Select the appropriate personal protective equipment for working with copper tube.		
6.2.6 Identify the material properties, storage, and handling requirements of copper pipe.	• Identify types of fittings and valves and their uses		

6.2.7 Identify the types of fittings and valves used with copper tube.	• Correctly measure, cut, ream, and join copper tube. •		
6.2.8 Demonstrate the techniques used in hanging and supporting copper tubing.	• Select the correct support and spacing for the application.		
Performance Indicator 6.3 Demonstrate a workable knowledge of drain, waste and sewage vent systems.	**Recommended Application/Activity**	**CCSS Standards**	**CCTC Standards**
6.3.1 Explain how waste moves from a fixture through the drainage system to the environment.			
6.3.2 Identify and explain the purpose of drainage traps and vent stacks.			
6.3.3 Identify and explain health issues, code violations and consequences of improper sewage and waste systems.			
Performance Indicator 6.4 Demonstrate a workable knowledge of home heating and air conditioning systems.			
6.4.1 Demonstrate the ability and uses of solder and solder fluxes.			
6.4.2 Identify the major components of a cooling system and explain how each type works.			
6.4.3 Explain how heat transfer occurs in a cooling system, demonstrating an understanding of the concepts used in the refrigeration cycle.			

Common Core State Standards Grades 9-12

ELA Speaking and Listening Standards Grades 9-10

1. Initiate and participate effectively in a range of collaborative discussions (one-on-one, in groups, and teacher-led) with diverse partners on grades 9–10 topics, texts, and issues, building on others' ideas and expressing their own clearly and persuasively. **SL9-10.1**
    a. Come to discussions prepared, having read and researched material under study; explicitly draw on that preparation by referring to evidence from texts and other research on the topic or issue to stimulate a thoughtful, well-reasoned exchange of ideas. **SL9-10.1a**
    b. Work with peers to set rules for collegial discussions and decision-making (e.g., informal consensus, taking votes on key issues, presentation of alternate views), clear goals and deadlines, and individual roles as needed. **SL9-10.1b**
    c. Propel conversations by posing and responding to questions that relate the current discussion to broader themes or larger ideas; actively incorporate others into the discussion; and clarify, verify, or challenge ideas and conclusions. **SL9-10.1c**
    d. Respond thoughtfully to diverse perspectives, summarize points of agreement and disagreement, and, when warranted, qualify or justify their own views and understanding and make new connections in light of the evidence and reasoning presented. **SL9-10.1d**
2. Integrate multiple sources of information presented in diverse media or format(e.g., visually, quantitatively, orally) evaluating the credibility and accuracy of each source. **SL9-10.2**
3. Evaluate a speaker's point of view, reasoning, and use of evidence and rhetoric, identifying any fallacious reasoning or exaggerated or distorted evidence. **SL9-10.3**
4. Present information, findings, and supporting evidence clearly, concisely, and logically such that listeners can follow the line of reasoning and the organization, development, substance, and style are appropriate to purpose, audience, and task. **SL9-10.4**
5. Make strategic use of digital media (e.g., textual, graphical, audio, visual, and interactive elements) in presentations to enhance understanding of findings, reasoning, and evidence and to add interest. **SL9-10.5**

ELA Language Grades 9-10

4. Determine or clarify the meaning of unknown and multiple-meaning words and phrases based on grades 9–10 reading and content, choosing flexibly from a range of strategies. **L9-10.4**
    a. Use context (e.g., the overall meaning of a sentence, paragraph, or text; a word's position or function in a sentence) as a clue to the meaning of a word or phrase. **L9-10.4a**
    b. Identify and correctly use patterns of word changes that indicate different meanings or parts of speech (e.g., analyze, analysis, analytical; advocate, advocacy). **L9-10.4b**
    c. Consult general and specialized reference materials (e.g., dictionaries, glossaries, thesauruses), both print and digital, to find the pronunciation of a word or determine or clarify its precise meaning, its part of speech, or its etymology. **L9-10.4c**

d. Verify the preliminary determination of the meaning of a word or phrase (e.g., by checking the inferred meaning in context or in a dictionary). **L9-10.4d**

6. Acquire and use accurately general academic and domain-specific words and phrases, sufficient for reading, writing, speaking, and listening at the college and career readiness level; demonstrate independence in gathering vocabulary knowledge when considering a word or phrase important to comprehension or expression. **L9-10.6**

Reading Standards for Literacy in Science and Technical Subjects Grades 9-10

1. Cite specific textual evidence to support analysis of science and technical texts, attending to the precise details of explanations or descriptions. **R9-10.1**
2. Determine the central ideas or conclusions of a text; trace the text's explanation or depiction of a complex process, phenomenon, or concept; provide an accurate summary of the text. **R9-10.2**
3. Follow precisely a complex multistep procedure when carrying out experiments, taking measurements, or performing technical tasks, attending to special cases or exceptions defined in the text. **R9-10.3**
4. Determine the meaning of symbols, key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to grades 9–10 texts and topics. **R9-10.4**
5. Analyze the structure of the relationships among concepts in a text, including relationships among key terms (e.g., force, friction, reaction force, energy). **R9-10.5**
6. Analyze the author's purpose in providing an explanation, describing a procedure, or discussing an experiment in a text, defining the question the author seeks to address. **R9-10.6**
7. Translate quantitative or technical information expressed in words in a text into visual form (e.g., a table or chart) and translate information expressed visually or mathematically (e.g., in an equation) into words. **R9-10.7**
8. Assess the extent to which the reasoning and evidence in a text support the author's claim or a recommendation for solving a scientific or technical problem. **R9-10.8**
9. Compare and contrast findings presented in a text to those from other sources (including their own experiments), noting when the findings support or contradict previous explanations or accounts. **R9-10.9**
10. By the end of grade 10, read and comprehend science/technical texts in the grades 9–10 text complexity band independently and proficiently. **R9-10.10**

Writing Standards for Literacy in History/Social Studies, Science, and Technical Subjects Grades 9-10

1. Write arguments focused on discipline-specific content. **W9-10.1**
   a. Introduce precise claim(s), distinguish the claim(s) from alternate or opposing claims, and create an organization that establishes clear relationships among the claim(s), counterclaims, reasons, and evidence. **W9-10.1a**
   b. Develop claim(s) and counterclaims fairly, supplying data and evidence for each while pointing out the strengths and limitations of both claim(s) and counterclaims in a discipline-appropriate form and in a manner that anticipates the audience's knowledge level and concerns. **W9-10.1b**
   c. Use words, phrases, and clauses to link the major sections of the text, create cohesion, and clarify the relationships between claim(s) and reasons, between reasons and evidence, and between claim(s) and counterclaims. **W9-10.1c**
   d. Establish and maintain a formal style and objective tone while attending to the norms and conventions of the discipline in which they are writing. **W9-10.1d**
   e. Provide a concluding statement or section that follows from or supports the argument presented. **W9-10.1e**
2. Write informative/explanatory texts, including the narration of historical events, scientific procedures/ experiments, or technical processes. **W9-10.2**
   a. Introduce a topic and organize ideas, concepts, and information to make important connections and distinctions; include formatting (e.g., headings), graphics (e.g., figures, tables), and multimedia when useful to aiding comprehension. **W9-10.2a**
   b. Develop the topic with well-chosen, relevant, and sufficient facts, extended definitions, concrete details, quotations, or other information and examples appropriate to the audience's knowledge of the topic. **W9-10.2b**
   c. Use varied transitions and sentence structures to link the major sections of the text, create cohesion, and clarify the relationships among ideas and concepts. **W9-10.2c**
   d. Use precise language and domain-specific vocabulary to manage the complexity of the topic and convey a style appropriate to the discipline and context as well as to the expertise of likely readers. **W9-10.2d**
   e. Establish and maintain a formal style and objective tone while attending to the norms and conventions of the discipline in which they are writing. **W9-10.2e**
   f. Provide a concluding statement or section that follows from and supports the information or explanation presented (e.g., articulating implications or the significance of the topic). **W9-10.2f**
3. Write precise enough descriptions of the step-by-step procedures they use in their investigations or technical work that others can replicate them and (possibly) reach the same results. **W9-10.3**
4. Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience.
   W9-10.4
5. Develop and strengthen writing as needed by planning, revising, editing, rewriting, or trying a new approach, focusing on addressing what is most significant for a specific purpose and audience. **W9-10.5**
6. Use technology, including the Internet, to produce, publish, and update individual or shared writing products, taking advantage of technology's capacity to link to other information and to display information flexibly and dynamically. **W9-10.6**

7. Conduct short as well as more sustained research projects to answer a question (including a self-generated question) or solve a problem; narrow or broaden the inquiry when appropriate; synthesize multiple sources on the subject, demonstrating understanding of the subject under investigation. **W9-10.7**
8. Gather relevant information from multiple authoritative print and digital sources, using advanced searches effectively; assess the usefulness of each source in answering the research question; integrate information into the text selectively to maintain the flow of ideas, avoiding plagiarism and following a standard format for citation. **W9-10.8**
9. Draw evidence from informational texts to support analysis, reflection, and research. **W9-10.9**
10. Write routinely over extended time frames (time for reflection and revision) and shorter time frames (a single sitting or a day or two) for a range of discipline-specific tasks, purposes, and audiences. **W9-10.10**

Common Career and Technical Core Standards

Architecture and Construction Career Cluster

Architecture and Construction Career Cluster Standards

1. Use vocabulary, symbols, and formulas common to architecture and construction. **AC1**
2. Use architecture and construction skills to create and manage a project. **AC2**
3. Comply with regulations and applicable codes to establish and manage a legal and safe workplace/jobsite. **AC3**
4. Evaluate the nature and scope of the Architecture and Construction Career Cluster and the role architecture and construction play in society and the economy. **AC4**
5. Describe the roles, responsibilities, and relationships found in the architecture and construction trades and professions, including labor/management relationships. **AC5**
6. Read, interpret, and use technical drawings, documents, and specifications to plan a project. **AC6**
7. Describe career opportunities and means to achieve those opportunities in each of the Architecture and Construction Career Pathways. **AC7**

Construction Career Pathway (AC-CST)

1. Describe contractual relationships between all parties involved in the building process. **AC-CST1**
2. Describe the approval procedures required for the successful completion of a construction project. **AC-CST2**
3. Implement testing and inspection procedures to ensure successful completion of the construction project. **AC-CST3**
4. Apply scheduling practices to ensure the successful completion of a construction project. **AC-CST4**
5. Apply practices and procedures required to maintain jobsite safety. **AC-CST5**
6. Manage relationships with internal and external parties to successfully complete construction projects. **AC-CST6**
7. Compare and contrast the building systems and components required for a construction project. **AC-CST7**
8. Demonstrate the construction crafts required for each phase of a construction project. **AC-CST8**

9. Safely use and maintain appropriate tools, machinery, equipment, and resources to accomplish construction project goals. **AC-CST9**

Design Preconstruction Career Pathway (AC-DES)

1. Justify design solutions through the use of research documentation and analysis of data. **AC-DES1**
2. Use effective communication skills and strategies (listening, speaking, reading, writing, and graphic communications) to work with clients and colleagues. **AC-DES2**
3. Describe the requirements of the integral systems that impact the design of buildings. **AC-DES3**
4. Apply building codes, laws, and rules in the project design. **AC-DES4**
5. Identify the diversity of needs, values, and social patterns in project design, including accessibility standards. **AC-DES5**
6. Apply the techniques and skills of modern drafting, design, engineering, and construction to projects. **AC-DES6**
7. Employ appropriate representational media to communicate concepts and project design. **AC-DES7**
8. Apply standards, applications, and restrictions pertaining to the selection and use of construction materials, components, and assemblies in the project design. **AC-DES8**

Career Ready Practices

1. Act as a responsible citizen in the workplace and the community. (CRP1)
2. Apply appropriate technical skills and academic knowledge. (CRP2)
3. Practice personal health and understand financial literacy. (CRP3)
4. Communicate clearly, effectively, and with reason. (CRP4)
5. Understand the environmental, social, and economic impacts of decisions. (CRP5)
6. Demonstrate creativity and innovation. (CRP6)
7. Employ valid and reliable research strategies. (CRP7)
8. Utilize critical thinking to make sense of problems and persevere in solving them. (CRP8)
9. Model integrity, ethical leadership, and effective management. (CRP9)
10. Develop an education and career plan aligned to personal goals. (CRP10)
11. Apply technology to enhance productivity. (CRP11)
12. Work productively in teams while integrating cultural/global competence. (CRP12)